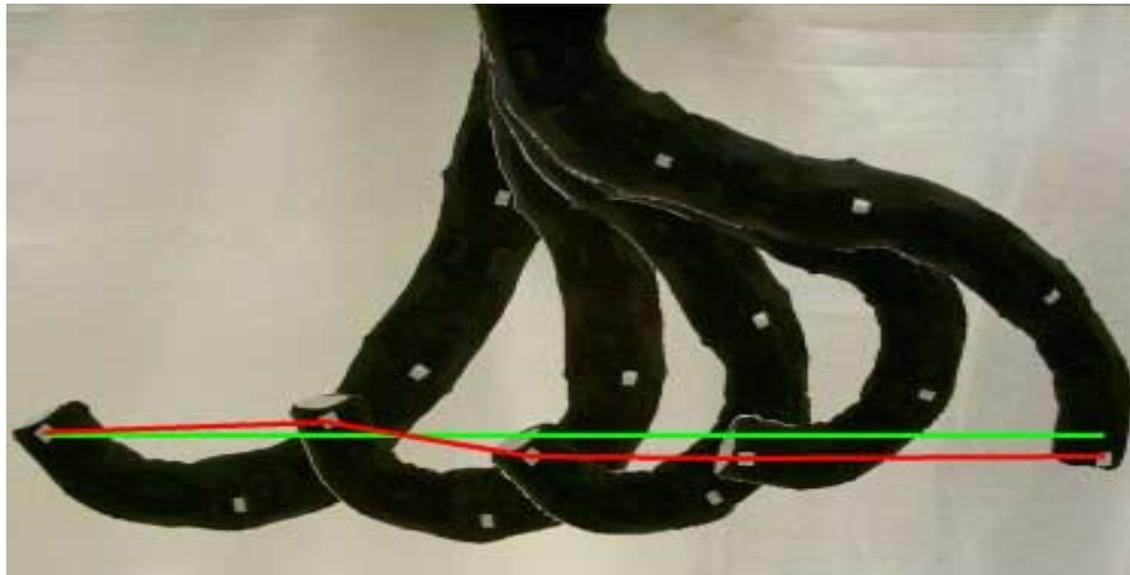

Design and Analysis of Trunk and Tentacle Robots

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Overview

- Robots which mimic biological “trunks and tentacles”
- Designs simple and inexpensive
- Ideal for navigation in cluttered environments
- Excellent for fine manipulation
- Significant Experience at Clemson in design, analysis

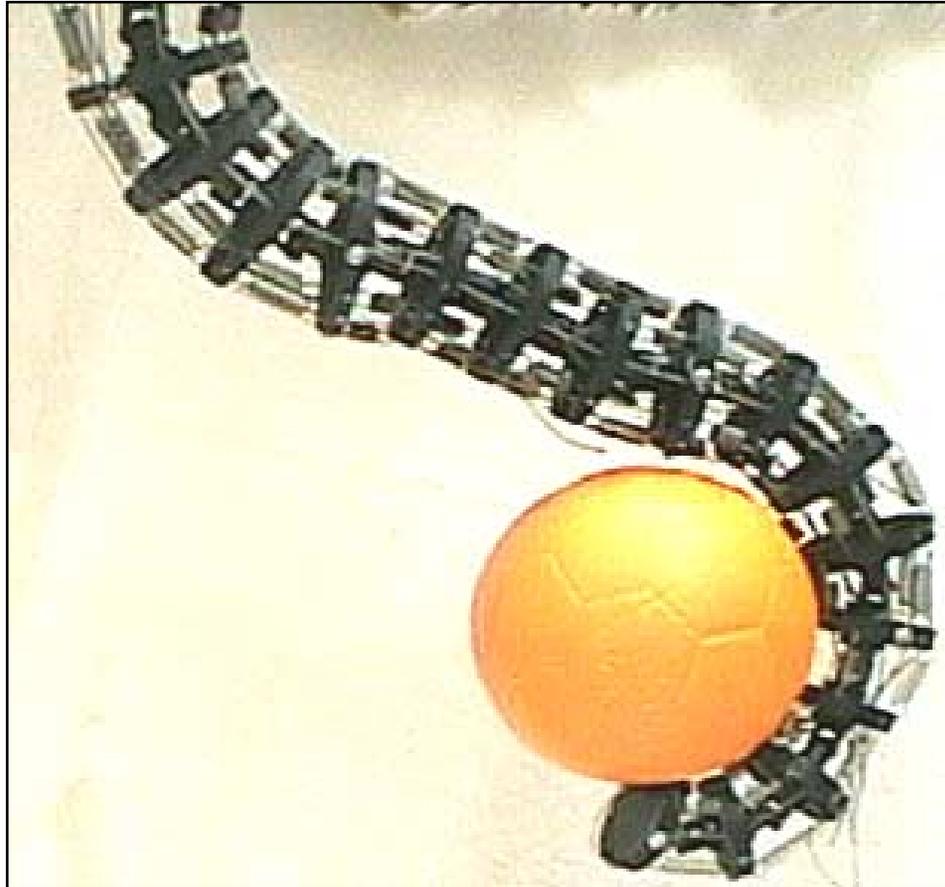


Tentacle/Whisker Robots



4 Degree of freedom, spatial tentacle

Trunk Robots



8 degree of freedom spatial “elephant’s” trunk

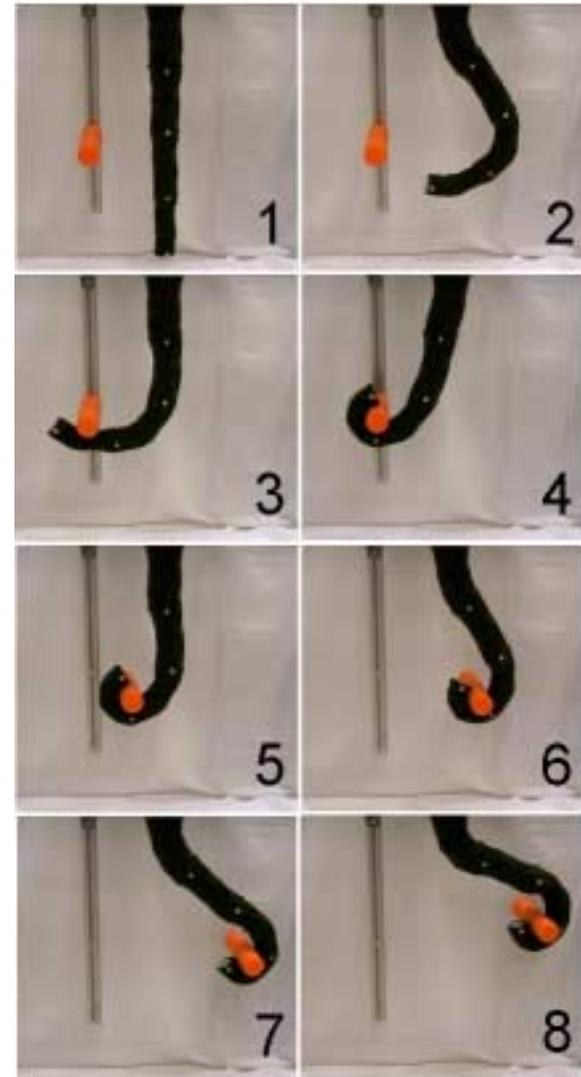
Some Advantages

- Very strong (can lift own weight)
- Relatively light
- Compact, clean design
- Highly reconfigurable
- Inherent compliance
- Inexpensive



New Manipulation Modes

- Devices can employ “whole-arm” manipulation
- Robots adapt to environmental geometry
- Exploits inherent compliance in structure
- Potential for novel robot “worms and snakes” exploiting “natural” locomotion modes



Summary

Capabilities:

- Extensive design experience at Clemson
- Proof-of-concept hardware built, demonstrated
- Kinematic modeling/motion planning complete

Potential Applications:

- Remote and cluttered environments
- Where adaptation to contact conditions is critical
- Deployment as manipulators on mobile robots, or alone as robot worms or snakes

